

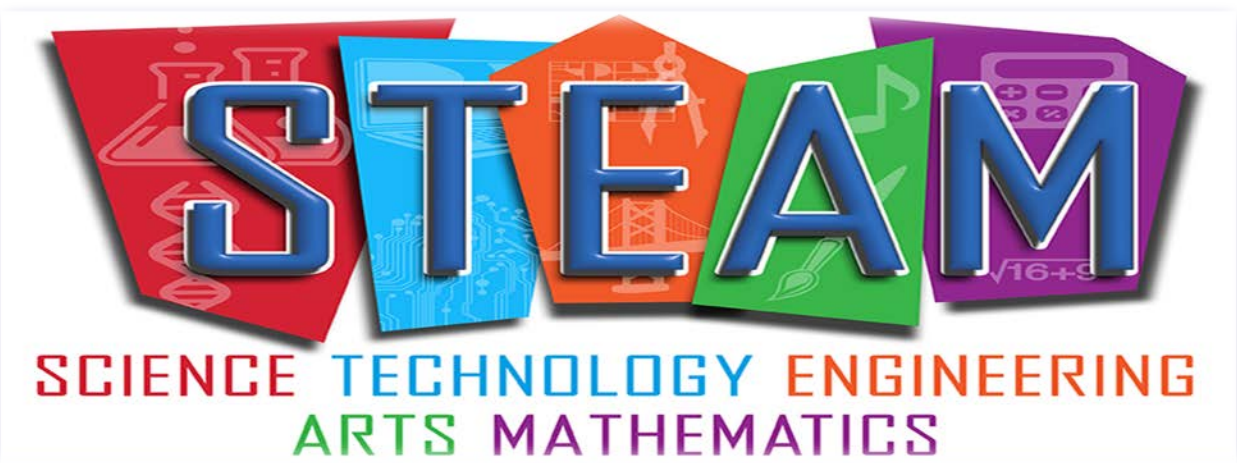


Preschool STEAM: Yes They Can!

(Science, Technology, Engineering, Arts & Math)



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ABSTRACT: This project addressed the need for STEM (Science, Technology, Engineering, and Math) initiatives at the early childhood level. Research states that early exposure to STEM initiatives and activities positively impacts elementary students' perceptions and dispositions (Bagiati, Yoon, Evangelou, & Ngambeki, 2010; Bybee, & Fuchs, 2006; DeJarnette, 2012). The goal of this research was to positively impact the implementation of STEAM (Science, Technology, Engineering, Arts and Math) lessons in the Early Childhood classroom through providing professional development for the Early Childhood teachers. It was hypothesized that through professional development, resources, and support, Early Childhood teachers would build efficacy and build positive dispositions towards developing consistent STEAM lessons for their preschool students. The findings confirmed this phenomena, however, a gap regarding implementation still exists.

GOAL:

To train in-service preschool teachers to efficiently and effectively incorporate STEAM in the early childhood classroom curriculum in order to have a greater impact on urban and minority preschool children's dispositions towards STEM.

RESEARCH QUESTIONS:

- 1) What will the result of providing staff development in STEAM (Science, Technology, Engineering, Arts and Math) initiatives for preschool teachers in high needs schools have on the rate of implementation of STEAM pedagogy in the early childhood classroom?
- 2) What will the result of providing staff development in STEAM initiatives for preschool teachers in high needs schools have on the self-efficacy of early childhood teachers as they implement?
- 3) What will the result of providing staff development in STEAM initiatives for preschool teachers in high needs schools have on the dispositions of early childhood teachers towards STEM as they implement?



METHODOLOGY:

- Two days of Professional Development workshop consisted of a hands-on presentation providing models of STEAM activities teachers can implement with their early childhood students.
- Pre and Post Surveys questioned the preschool teacher participants concerning their knowledge, skills, and dispositions regarding STEAM implementation within their classrooms
- All materials were inexpensive or use every day recyclables. For the preschool level, STEAM (add Arts) activities are built around children's literature.
- The STEAM activities followed the new NGSS (Next Generation Science Standards) and incorporated the Children's Engineering Design Model.
- Participating teachers were encouraged to invite the researcher into their classrooms to observe and assist with STEAM lessons during the spring 2016 semester.
- Teacher interviews were conducted after these classroom observations regarding their efficacy towards STEAM implementation efforts.
- Focus groups were conducted during the final professional development day in May, gathering feedback regarding the STEAM implementation process.
- Funding provided by the UB Seed Funding Grant 2016

PROFESSIONAL DEVELOPMENT:

Two days of Professional Development were provided for the Bridgeport ABCD Early Learning Center Preschool Teachers (n=50).



STEAM Demonstration Lessons in Preschool Classrooms.

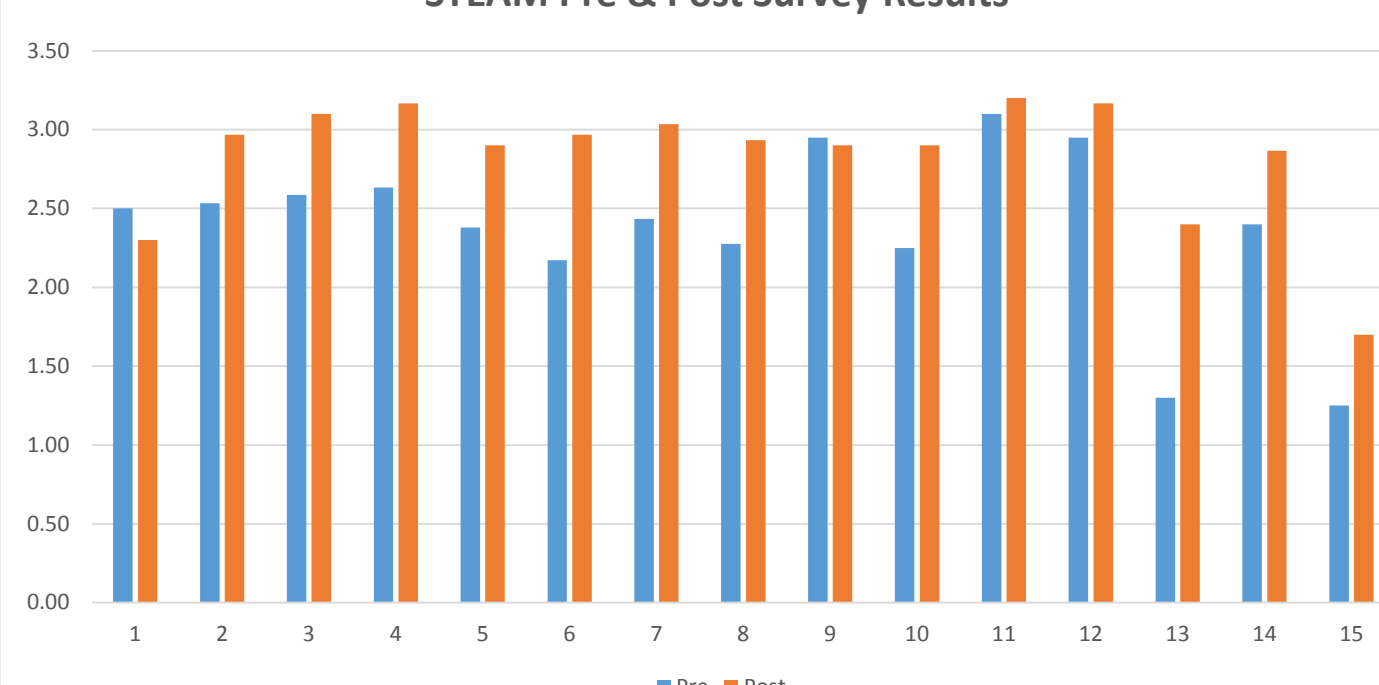
LITERATURE:

Research has shown that early exposure to STEM initiatives and activities positively impacts elementary students' perceptions and dispositions towards STEM (Bagiati, Yoon, Evangelou, & Ngambeki, 2010; Bybee & Fuchs, 2006; DeJarnette, 2012). As STEM initiatives continue to grow in America, the need for early exposure during the elementary years is gaining popularity (Bagiati, et al., 2010). By exposing children to STEM disciplines during the elementary years through hands-on, interactive, and problem solving activities, research indicates that children's interest in STEM career fields' increases which establishes an educational pathway for the future (Katehi, Pearson, & Feder, 2009).

FINDINGS:

Paired Samples Correlations				
Pair 1	Pre & Post	N	Correlation	Sig.
		12	.579	.049

STEAM Pre & Post Survey Results



SAMPLE PROBLEM-SOLVING ACTIVITY:

Example: *Fairy Tales...*



Read aloud: <ul style="list-style-type: none">• <i>The Gingerbread Man</i>	Design, Build & Test <ul style="list-style-type: none">• (Test & Improve)<ul style="list-style-type: none">• Design & build a boat out of tinfoil and other materials provided
Discussion: <ul style="list-style-type: none">• Alternate ways for the Gingerbread man to cross the stream	Assessment: Rubric
Planning: <ul style="list-style-type: none">• Cooperative groups plan & draw their design ideas	
Literature...	Science / Art....



CONCLUSIONS:

- The findings did indicate that the teachers' dispositions towards STEM content did increase as a result of the training.
- The findings revealed that through the workshop, supplied resources, and modeling of the STEAM activities, the teachers did experience a positive increase in their self-efficacy regarding STEM.
- Although their survey results showed a rise in their confidence and dispositions, during the interview process, teachers revealed that they still would need more professional development in order to fully implement STEAM lessons within their classrooms.